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Pollution-Caused Fish Kills in 1967 (8th Annual Report)

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The report is an analysis of pollution-caused fish kills compiled from data supplied by State officials. It includes analytical text and the following tables: major kills, historical summary, summaries by State, source, water body, operation, severity, type of water, month, and duration. Also includes a cumulative listing of the reports received.

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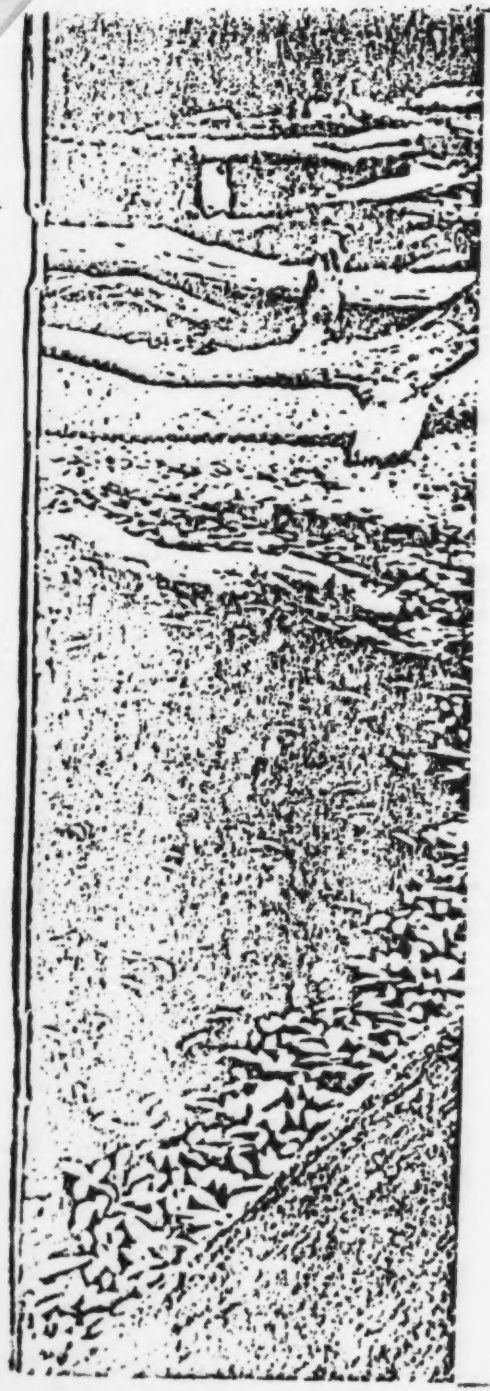

POLLUTION CAUSED FISH KILLS--1967

eighth annual report

FEDERAL WATER POLLUTION CONTROL ADMINISTRATION • WASHINGTON, D.C. 20242

ATTENTION

AS NOTED IN THE NTIS ANNOUNCEMENT, PORTIONS OF THIS REPORT ARE NOT LEGIBLE. HOWEVER, IT IS THE BEST REPRODUCTION AVAILABLE FROM THE COPY SENT TO NTIS.

pollution kills more than 11 million fish in 1967

A total of 11,591,000 fish were reported killed by identifiable pollution sources in 40 States during 1967. This was an increase of 2,476,000 or 21 percent over 1966 when 9,115,000 fish were killed in 46 States.

Besides the 375 reports of definite fish kills by pollution, there were 78 other incidents in which pollution was suspected but the source could not be determined.

Since the annual census began in June, 1960, a total of 88,144,000 fish have been reported killed in 2,451 individual cases.

Rather than indicating any significant trends in pollution, the increased fish kills may well reflect weather changes or improved reporting practices by the cooperating State officials.

One fish kill—on the Boone River at Webster City, Iowa—accounted for more than half of the fish killed last year. A valve failed in a frozen food plant releasing 600 gallons of ammonia into the river. The deadly liquid killed 6,549,200 fish, mostly minnows, in a six-to-seven mile stretch of the Boone River.

Phosphate mining operations were responsible for the second greatest fish kill in 1967. When a dam broke on a settling basin at a mine in Florida, a mass of phosphate slime flowed into the Peace River, suffocating all the fish life in 76 miles of the river. Fish

toll was set at 984,430. Dead bass weighing as much as eight pounds and shellcrackers as large as dinnerplates were taken from the slime-coated water.

The chemical company which operates the mine settled damages claimed by the State for $200,000.

A relatively new problem in pollution control—drainage from feedlots where cattle are fattened for the market—caused three major kills, totalling 900,000 fish. Two occurred on the Cottonwood and Neosho Rivers in Kansas and the third on Buffalo Lake at Umbarger, Texas.

Most fish kills are the result of mechanical failures, aecidents, ignorance or human carelessness. But in 10 instances last year, the pollution was deliberate. And in one, three persons were arrested after they went "fishing" with Rotenone. They applied the insecticide to a river and their "catch" was 100 dead fish.

A muskrat, usually a vegetarian, "caught" 2,000 fish by simply digging a hole through a dike. It just happened that the lagoon behind the dike contained wastes from a hog-feeding lot and when these wastes reached a stream, the fish were suffocated.

The annual fish kill report since its beginning eight years ago has been the work of many individuals, State fish and game officers and pollution officials all seeking to protect the fish and quality of the water.

Last year as always it was the individual enjoying his sport or a State conservation officer on patrol who spotted the dying fish, and immediately reported the trouble. Many times this helped to prevent a pollution situation from spreading or continuing. And it always made it easier for State experts to get quickly to the scene of the pollution in order to determine the cause of the kills.

The State agencies forward the information to the Federal Water Pollution Control Administration of the Department of the Interior where it is compiled and published.

Industrial pollution again led the report both in the total number of fish killed and in the number of incidents. States reported 139 cases of industrial pollution with 8,217,000 fish killed., This was 71 percent of the total fish killed. Pollution from farming practices replaced wastes from cities as the second most deadly type of pollution in 1967. A total of 1,805,000 or 16 percent of the fish killed could be traced to farms. Cities' wastes, placing third, caused the death of 731,000 fish. Transportation accidents such as when a pipeline breaks or leaks or when a truck or railroad car overturns was the fourth specific category and collectively responsible for 166,000 fish being killed.

The remaining 33 kills that couldn't be classified under the previous categories were the cause of 638,000 fish being killed. Activities causing the pollution involved were highway and housing construction, discharge of heated water from private power companies, land fill operations, airport and service station operations and deliberate poisoning.

The average size of fish kills in 1967 was 6,460, the highest since 1963 when the average was 7,775. These averages, as in the past reports, are derived after the exclusion of all kills of 100,000 or more as not being typical. The 10,400 average for agricultural pollution is the highest since the five categories were established in 1963. Pollution by transportation activities was second with an average of 7,535.

A total of 1,806,000 game fish were killed by pollution. This was 16 percent of the grand total. Some 2,510,000 fish with commercial value were taken out of the market by pollution.

Pollution caused by the manufacturing and processing of food products was responsible for death of 6,664,237 fish, but the one major kill mentioned previously accounted for 6,549,200 of the total. Wastes draining from livestock feedlots was second in number of fish killed with 1,268,137. Mining operations and the problem of acid draining

from the sites into streams was next with 1,113,389. Malfunctioning, poorly operated, or inadequate municipal sewage treatment plants was the most often named cause with 74 reports. Sixty of these which gave a definite number of fish killed accounted for 627,000 fish.

The use by farmers of insecticides or herbicides was mentioned 43 times as causing pollution kills. With only 32 of these reports giving a definite number, this type of pollution caused at least 329,000 fish to be killed. In a separate tabulation not shown in this report it was found that insecticides were involved in 58 fish kills, including the 43 for agricultural. Ten of the additional 15 were related to poaching, the rest for mosquito or algae control. A total of 337,000 fish were reported killed in 44 of the 58 reports.

Pollution in rivers or streams caused the death of 10,733,833 fish or 88 percent of the total. Pollution in lakes was responsible for the death of 385,000 fish. The greatest number of fish kills occurred during July and August, but the most fish were killed in the months of March and September. As in the past, summer months usually have the heaviest fish kills, but there are exceptions to this rule, and any month in the year can experience a large fish kill.

The average duration of pollution kills in 1967 was 3.34 days as compared to 2.7 days in 1966. Total fish kills average 3.37 days while the heavy kills lasted about 16 hours longer.

Agricultural and industrial fish kills averaged almost the same length—3.62 and 3.60 days, about 18 hours longer than the next category which was municipal wastes. Almost half, 46.7 percent of the agricultural-caused fish kills were considered heavy, while a third or 32.5 percent of the industrial kills were classified as such.

Of the ten States not included in the annual fish kill census, Arizona and Wyoming submitted reports of kills, but the source of the pollution could not be determined. There were no reports from the remaining eight States.

Even though the annual census doesn't reflect all the fish killed by pollution in the United States in 1967, the report serves to point out the need for continuing vigilance and the need for stricter safeguards to keep dangerous substances out of the Nation's water resources.

The census can not possibly be all inclusive because many fish kills go unreported while others are unobserved. And of the 375 reports in 1967, only 303 gave a definite number of fish killed. The remaining 72 gave such answers as "thousands" or listed the kills in pounds or failed to give any estimate.

HIGHLIGHTS FROM THE REPORTS

Cotton fields sprayed with one and one-half pints per acre of endrin and methyl parathion once a week by airplane. Some 71,430 fish killed following heavy local rains which washed poison into creek.

Transformer malfunction shutdown sewage treatment plant for 3½ hours. Untreated wastes reached creek, lowering dissolved oxygen and causing 3,168 fish to die.

Seventeen hundred acre pasture in a river watershed sprayed with 20 pounds of toxaphene per acre by airplane. Fish killed following heavy local rains which washed material into river. Total number of fish killed is unknown.

Waste water from a lumber company's treatment plant washed into the lake after a heavy rain, killing 13,900 fish.

Waste oil and solvents discharged from a service station into the stream, killing 200 fish.

Flyash water from a power company settling pond in another State escaped and killed 54,000 fish in a 34-mile stretch of stream in adjoining State. A settlement of $15,654.69 for fish loss reached by agreement between State game and fish and company officials.

An unknown quantity of JP-4 jet fuel spilled when personnel removed refueling hoses from a tanker plane too quickly. The base fire department flushed the fuel off the field into ditches. The fuel entered the creek through these tributary ditches, killing 400 fish.

During a grouting operation by a road construction company, water passing over fresh cement entered the river through several breaks in a dike. When acid-alkalinity balance of water was upset, 800 to 1,000 fish were killed.

Septic conditions and heavy deposits of sewage sludge and paper were reported on the stream bottom for two miles below the city's sewage treatment plant. Several hundred fish were killed by lack of oxygen.

A sugar company discharged its sugar beet washings, lime, and coal ash through inoperative ponds into river. Heavy turbidity prevented an estimate of the number of fish killed.

Spray trucks for fruit groves spilled an oil base insecticide into a lake and along the shoreline, killing 164 fish. State Board of Health had to close the public beach.

Careless handling and spraying of pesticides (Ethion) during summer spraying of orange grove surrounding lake, resulted in 61,745 fish being killed.

When a rancher sprayed sheep with a pesticide containing toxaphene and malathion about 1½ miles upstream from a private trout farm, some of the chemical flowed directly into a small spring-fed tributary to a creek. Thousands of trout were killed. The sheep-spraying stall was located about 40 feet from the tributary stream bank with a downhill grade to the stream. Loss to the commercial hatchery was 10,000 pounds or about 30,000 trout. Loss of State fish was 693 pounds or 2,079 trout.

Soil washed from a highway construction area following a heavy rain causing a dieoff of an algae bloom during a period of cloudy weather. This resulted in lowering of oxygen content in water in an impoundment below the construction site. 6,200 fish killed.

A spigot on a large tank of neutrasol broke, allowing approximately 300 gallons of the fertilizer to seep into river. Five thousand fish were killed along one bank in the lower one-mile section of the river. Steelhead trout, chinook salmon, and smallmouth bass were killed. The liquid fertilizer also discolored the rocks on the bottom of the river.

Fill kill appears to have resulted from continual release of materials having high oxygen demand directly into the stream from a food-processing plant. Flow of stream had been reduced by upstream regulation. Oxygen level reached zero in stream from source of pollution to 4 miles downstream, 20 percent of saturation at 6 miles, and 60 percent saturation at point 10 miles below source of pollution. No live fish were observed in upper 7 miles, dying suckers observed 7 to 8 miles below source. Most fish in stream were probably killed in December-January low-flow period as evidenced by decomposed carcasses. Other pollution casualties observed were 6 sheep and cattle carcasses.

Dairy waste discharged by pipe from company's lagoon directly into stream, killing 47,731 fish.

Accidental break in a 10-inch pipeline carrying gasoline spilled into creek, but fast action by oil company limited the damage. 6,757 fish were killed. Monetary loss set at $210.49.

A food-packing company, prior to the fish kill, was discharging to the river instead of the spray irrigation system. A farm field near the area of the kill was treated with pesticide. When a heavy rain occurred organic material from the company and sediment from the farm field was flushed into the stream, lowering the dissolved oxygen. Several thousand fish killed.

Unknown chemical spilled during barge unloading operation. 10,000 to 100,000 fish killed.

Electric company changed the solution in a bath which provides a liquid to cool and lubricate dies used in drawing copper wire. The coolant foamed vigorously and overflowed into drains connected to a storm sewer. 450 fish killed.

Fertilizer company flushed sludge from a sulfuric acid tank into the stream through a field tile killing 25 fish.

Cyanide, released to the sewerage system by a metal-treating company, reached a stream through the town's sewerage system lift station bypass. 4,100 fish killed.

Accidental overflow from a soluble oil storage tank at an automotive transmission plant reached a stream through a storm sewer. 311 fish killed.

Well on a mint oil production farm containing sulphur-bearing water had been idle all winter. The initial, highly turbid discharge from the well was diverted into a ditch killing several hundred fish.

Untreated wastes from a distillery discharged into stream killing 1,000 pounds of fish.

Thousands of fish killed over a period of more than one week. A strong odor associated with a pulp and paper company was clearly detectable and masses of organic matter rose from the bottom of the stream. Several agencies plan studies to determine the exact cause.

Fish were killed apparently by residual rotenone following the conservation department's treatment of river to eradicate rough fish. 329 fish killed.

One thousand minnows were killed by chemicals (copper sulfate and sodium arsenite) used for weed and algae control in creek by owner of golf course.

Metal plating company accidentally discharged 360 gallons of zinc cyanide to city sanitary system. 800 to 1,000 fish killed.

Septic tank cleaner emptied a truck load of industrial wastes on land which underdrains to a creek. 200 fish killed.

Food-packing company cleaned its boiler system with acid and buffering compounds. Materials reached river through floor washing, killing 50,000 fish.

Construction company washed river water into its sand pit and then pumped sand out letting water from operation into the river without settling abrasive materials and silt. An estimated 90 percent of the 1,000 fish killed were channel catfish and flathead catfish.

Natural gas company plant discharged waste water containing high chlorides from water softeners into river. 2,000 fish killed.

Manure wastes in stream traced to livestock feedlots upstream along the river. First noted "foul" water passing over dam on the river was on January 27. On February 1, fur trappers working the river near the rapids noted channel catfish at the water's surface being washed over the riffles. The fish were alive but in distress. On February 2, trappers observed masses of varied species of fish, both dead and in distress, in the same stretch of stream. The slug of manure wastes moved slowly downstream and decomposition was slow because of low water temperature. Runoff occurred along with a slight 6-inch rise on the stream following a period of snow melting and light rains. 225,000 fish killed.

Intentional application of lime to a pond killed many large fish. Person responsible was found guilty in court and fined. 300 fish killed.

Creek is partially repopulated with fish each year from river and tributaries. Fish are killed almost every year by acid drainage from abandoned coal strip mines. 61,000 fish killed this year.

Application of mosquito larvacide to the city park pond killed 450 fish.

Textile company accidentally discharged approximately 18,000 gallons of 50 percent caustic soda. 15,000 fish killed.

Five thousand fish were killed when water containing 50 parts per million of chlorine was released from a newly installed water main. Drain valves were located at three positions where the main crossed the creek. Fish and aquatic life eliminated for about one-half mile below each valve site.

Whey, a byproduct in the manufacture of cottage cheese, dumped into a sink hole by a dairy employee. A subterranean flow, supplemented by heavy rain, brought pollutant to stream. Water was tinted light gray and the bottom was covered with silt and growth of filamentous bacteria. 185 fish killed.

Diesel fuel line was broken at a batch cement-mixing plant and approximately 1,200 gallons of fuel leaked underground into a small tributary, then into the branch of creek. All insect and fish life killed in the tributary and approximately 70 percent of insects and fish were killed in the larger stream. The duration of the effect is unknown as the oil will drain for week. 2,311 fish killed.

Wreck on a railroad ruptured a tank car which leaked sulphuric acid into stream for days. Grass and stream bank were burned black by acid. An accurate count of dead fish was impossible because of the heavy ice in the stream, but the kill was extremely heavy. In excess of 10,000 fish killed.

Oil tank truck overturned spilling 1,600 gallons of gasoline into stream. In addition to fish being killed, other aquatic life was destroyed. The water was oily but the bottom normal in the damage zone. 200 fish killed.

Oxidation lagoon for a dye plant was drained into a stream. Accumulated sludge wastes washed into the creek following a heavy local rain. 200 fish were killed.

Two hundred and eighty-six sacks of cement fell off a truck into the creek, killing 200 trout.

Potato crop sprayed by aircraft. Rain one hour later washed spray into pond. 500 fish killed.

Oil pipeline was cleaned and the waste dumped into a stream. 500 fish killed.

Stream devoid of life for two miles. Frequent use of "Zep" for filter flies apparently renders stream in this area uninhabitable because of toxicity and destruction of food organisms. 100 fish killed.

Truck wash water from a chemical company was drained into lagoons. Evidently they did not hold and the strong detergent water flowed into the stream. 1,500 fish killed.

Cleaning liquid from metal-wire recovery company containing copper had been poured over waste products and overflowed into a small holding pond and then into stream. 2,032 fish and all other aquatic life destroyed.

City has combined storm and sanitary sewers. When it rains the waste treatment plant is forced to bypass untreated sewage into bay. Winds cause the top currents to go to the bay and the bottom currents carry the waste solids into the lake and then deposit them in the south pier area. 2,000 fish killed.

When gasoline truck overturned at an underpass six thousand gallons of gasoline spilled into a storm sewer and ended up in a creek. In addition to fish, 3 wood ducks and a muskrat were killed. Water was oily and bottom vegetation covered with oily slime. 14,062 fish killed.

Employee of a school back-flushed the filtering system of a new swimming pool installation and the chlorine residue was dumped in the stream. 750 fish were killed and aquatic insects and worms were also destroyed. The water appeared normal, as did the bottom in the damage zone.

Power company has a recirculated fly ash system for power plant. Only make-up water is added to system. Continuous use of water causes the concentration of lime to rise and a hydroxyl alkalinity of 600-1400 parts per million. The pond containing 130 million gallons of waste water emptied into river in 30-45 minutes when dike broke. The power company has contributed $28,415 to the State for the restocking of the river with game fish. 162,620 fish killed.

Carbon particles, originating from the boiler blow-down operation of a ship, partially dissolved in the water, killing approximately 30,000 bait and commercial herring.

Dredging depleted oxygen in a pool formed by dam across stream that furnished water for a local plywood plant. 16,000 silver salmon killed.

Waste oils discharged from a railroad roundhouse and treatment facility killed 400 to 500 fish. Oil was traced from point of discharge to a tributary of river, on downstream, from which point it was diverted into a canal, and thence into the inlet of a reservoir. Complaints of fish flesh tasting of oil on this water had been received for a 2 to 3 month period prior to the kill. Walleye, largemouth bass, and brown trout were killed.

Gas well was flushed with HCl and detergents. Overflow pond was too small. Though a moderately rich stream with a large volume of water held in long flat pools, wash water still killed bass, bullheads and bluegills through 8 miles of stream. A kill was reported last year too. Musky inhabit the stream, but none were found in this kill. 8,000 fish killed.

Contractor working for city completed installation of 2,000 feet of pipeline and cleaned pipe by flushing with chlorine solution. Solution drained to street gutters, to storm drain, and then into creek. 5,000 fish killed.

Cyanide killed 4,000 fish when it was used by electroplating plant to clean its exhaust fume system. Fluid escaped to river.

Oil and phenols escaped from a garage and were deposited on the stream banks. Heavy thunderstorms washed the pollutants into stream. All bottom life and insect life appeared to be absent from the damage area. Water was oily. 2,500 fish killed.

Driver neglected to close a valve while transferring Number 2 oil from truck to an underground tank on the property of an oil company. Driver fell asleep. 14,800 gallons of oil was discharged into stream. Efforts of company officials minimized overall effect of the oil. Fish and other aquatic life destroyed. 1,100 fish killed.

Highway maintenance crews sprayed a heavy tar-like substance along the highway in the area of a privately owned fishing lake. After a heavy shower some of the tar washed into tributary and thence into the lake. 54 fish killed.

Excessive ammonium nitrogen concentration from agricultural operations caused a fish kill of 250,000.

MAJOR KILLS — 100,000 OR OVER

LAKE OR STREAM	NEAR OR IN	NO. KILLED	OPERATION
Boone River	Webster City, Iowa	6,549,200	Food products
Peace River	Fort Meade-Arcadia, Fla.	983,430	Mining
Cottonwood & Neosho Rivers	Emporia, Kansas	425,000	Manure drainage
Scioto River	Franklin County, Ohio	317,390	Sewerage system
Sandusky River	Sandusky County, Ohio	300,384	Other
Buffalo Lake	Umbarger, Texas	250,000	Manure drainage
Neosho River	Neosho Rapids, Kansas	225,000	Manure drainage
Clinch River	Carbo, Virginia	162,620	Other

TABLE 1 — Historical summary of pollution-caused fish kills, June 1960 — December 1967

	JUNE-DECEMBER 1960	1961	1962	1963	1964	1965	1966	1967
Number of States reporting	36	45	37	38	40	44	46	40
Number of reports	286	411	381	436	485	531	436	375
Reports which state number of fish killed	149	263	233	300	385	446	372	303
Total estimated number of fish killed	6,379,000*	15,910,000*	7,118,000*	7,860,000	18,387,000	11,784,000	9,115,000	11,591,000
Average size of kill **	2,925	6,535	5,710	7,775	5,490	4,310	5,620	6,460
Largest kill reported	5,000,000	5,387,000	3,180,000	2,000,000	7,887,000	3,000,000	1,000,000	6,549,000
Reports where extent of area affected was stated								
River								
Number of reports	189	240	259	271	339	292	251	219
Miles of stream	1,204	1,686	1,448	2,203	1,440	1,300	989	1,039
Lakes and reservoirs								
Number of reports	25	50	25	49	57	38	46	33
Acres affected	1,407	5,967	2,581	5,644	12,637	4,630	21,564	1,996
Average duration of kill in days	2.95	2.64	2.59	3.18	2.44	2.57	2.71	3.34

* After adjustment for reports giving two or more causes.

** Excludes reports of 100,000 or more as being unrepresentative; this number does not exceed 21 reports in any one year.

TABLE 2 — Pollution-caused fish kill summary, by State

	TOTAL REPORTS	FISH KILLED		EXTENT OF DAMAGE					
				RIVER		LAKE		SHORE	
		REPORTS	FISH	REPORTS	MILES	REPORTS	ACRES	REPORTS	MILES
Alabama	7	6	226,807	5	23	—	—	—	—
Arkansas	6	1	13,900	—	—	1	150	1	3
California	10	10	16,413	8	13	—	—	—	—
Colorado	7	3	16,060	3	5	2	51	—	—
Connecticut	4	1	7,500	2	3	1	15	—	—
Delaware	1	1	200	—	—	1	4	—	—
Florida	4	4	1,053,984	2	78	2	80	—	—
Georgia	4	—	—	—	—	3	15	—	—
Idaho	4	4	37,979	2	11	—	—	—	—
Illinois	10	10	142,118	8	37	—	—	—	—
Indiana	20	16	22,916	13	51	—	—	—	—
Iowa	13	11	6,675,300	11	63	—	—	—	—
Kansas	29	29	1,031,450	26	159	3	11	—	—
Kentucky	2	—	—	2	3	—	—	—	—
Louisiana	6	5	17,250	6	43	—	—	—	—
Maine	2	1	85	—	—	—	—	—	—
Maryland	1	1	12	1	1	—	—	—	—
Massachusetts	1	1	1,000	1	1	—	—	—	—
Michigan	8	7	13,629	7	20	1	3	—	—
Minnesota	4	3	8,050	2	17	—	—	—	—
Missouri	20	20	82,200	16	61	3	3	—	—
Montana	1	1	200	1	2	—	—	—	—
Nebraska	10	5	21,050	5	21	4	24	—	—
New Hampshire	5	—	—	1	2	1	1,500	—	—
New Jersey	14	11	3,400	6	8	5	14	—	—
New York	16	15	50,475	9	19	1	2	—	—
North Carolina	4	4	18,350	4	15	—	—	—	—
Ohio	47	45	932,892	—	—	—	—	—	—
Oklahoma	3	3	7,500	2	8	1	2	—	—
Oregon	6	3	15,150	5	15	—	—	—	—
Pennsylvania	39	38	92,043	34	87	3	22	—	—
South Carolina	1	1	6,000	1	5	—	—	—	—
South Dakota	1	—	—	1	3	—	—	—	—
Tennessee	3	2	57,000	1	36	—	—	—	—
Texas	33	16	281,375	19	86	1	100	—	—
Utah	3	2	2,950	1	20	—	—	—	—
Virginia	5	5	183,683	2*	82	—	—	—	—
Washington	11	9	61,000	5	14	—	—	—	—
West Virginia	9	8	19,120	6	26	—	—	—	—
Wisconsin	1	1	10	1	1	—	—	—	—
Total	375	303	11,119,051	219	1,039	33	1,996	1	3

TABLE 3 —

SOURCE OF POLLUTION

Agricultural operations

Industrial operations

Municipal operations

Transportation operations

Other operations

Total

* Averages derived after exclusi
** Includes all fish killed as repor
given.

TABLE 5 —

TYPE OF WATER BODY

River

Lake

Bay

Total

Fish kill summary by source of pollution

TOTAL REPORTS	REPORTED KILLS		AVERAGE KILL*	ESTIMATED FISH KILLED **			
	REPORTS	FISH		TOTAL	GAME	NONGAME	COMMERCIAL
90	71	1,607,267	10,400	1,805,000	431,000	1,374,000	762,000
139	113	8,087,091	4,995	8,217,000	822,000	7,395,000	954,000
91	72	643,304	4,590	731,000	301,000	430,000	376,000
22	19	143,123	7,535	166,000	74,000	92,000	63,000
33	28	638,266	6,740	672,000	178,000	494,000	355,000
375	303	11,119,051	6,460	11,591,000	1,806,000	9,785,000	2,510,000

* reports of 100,000 or more.
** plus the average number killed for each source applied to those reports where no actual number was

Fish kill summary by type of water body

TOTAL REPORTS	FISH KILLED		EXTENT OF DAMAGE					
			RIVER		LAKE		SHORE	
	REPORTS	FISH	REPORTS	MILES	REPORTS	ACRES	REPORTS	MILES
332	273	10,733,833	219	1,039	—	—	—	—
43	30	385,218	—	—	33	1,996	1	3
—	—	—	—	—	—	—	—	—
375	303	11,119,051	219	1,039	33	1,996	1	3

TABLE 4 — Fish kill summary by operation

SOURCE OF POLLUTION	TOTAL REPORTS	REPORTED FISH KILLED	
		REPORTS	FISH
Agricultural			
Insecticides, poisons, etc.	43	32	329,130
Fertilizers	2	2	10,000
Manure-silage drainage	45	37	1,268,137
Subtotal	90	71	1,607,267
Industrial			
Mining	19	16	1,113,389
Food products	26	18	6,664,237
Paper products	5	4	6,839
Chemicals	24	22	43,732
Petroleum	19	12	53,434
Metals	19	17	49,666
Combinations	3	3	7,811
Others	24	21	147,983
Subtotal	139	113	8,087,091
Municipal			
Sewerage systems	77	60	626,544
Refuse disposal	1	—	—
Water systems	8	7	11,872
Swimming pool	4	4	4,688
Power	1	1	200
Subtotal	91	72	643,304
Transportation			
Rail	4	3	12,950
Truck	7	7	27,062
Barge or boat	3	3	80,250
Pipeline	8	6	22,861
Subtotal	22	19	143,123
Other operations	33	28	638,266
Total	375	303	11,119,051

TABLE 6 — Fish kill summary by water type

	TOTAL REPORTS	REPORTED FISH KILLED	
		REPORTS	FISH
Fresh	366	300	11,086,012
Salt	4	1	30,000
Estuary	5	2	3,039
Total	375	303	11,119,051

TABLE 7 — Fish kill summary by month

	TOTAL REPORTS	REPORTED FISH KILLED	
		REPORTS	FISH
January	14	12	431,827
February	9	7	237,750
March	21	19	1,265,204
April	38	30	77,158
May	35	25	551,663
June	48	39	659,718
July	66	54	300,674
August	66	53	359,881
September	45	40	6,975,908
October	27	19	155,718
November	5	4	99,550
December	1	1	4,000
Total	375	303	11,119,051

TABLE 8 — Fish kill summary by severity of kill

	TOTAL REPORTS	REPORTED FISH KILLED		AVERAGE KILL*
		REPORTS	FISH	
Total kill	45	38	6,988,000	6,710
Heavy kill	130	103	3,185,000	10,330
Moderate kill	75	62	318,000	4,235
Light kill	52	42	46,000	880
Not stated	73	58	1,054,000	6,225
Total	375	303	11,591,000	6,460

* Average derived after exclusion of 8 reports of 100,000 or more.

TABLE 9 — Distribution of duration by severity of kill

(Number of reports showing kills lasting indicated number of days)

DAYS	TOTAL REPORTS	TOTAL KILL	HEAVY KILL	MODERATE KILL	LIGHT KILL	NOT STATED
1	28	4	10	2	12	—
1	52	8	20	10	11	3
2	56	8	19	22	7	—
3	36	9	12	10	4	1
4	12	—	6	5	1	—
5	8	—	4	3	1	—
6	—	—	—	—	—	—
7	6	—	4	2	—	—
8	1	—	1	—	—	—
9	—	—	—	—	—	—
10	1	—	1	—	—	—
11	—	—	—	—	—	—
12	1	—	1	—	—	—
13	—	—	—	—	—	—
14	2	—	2	—	—	—
15	1	—	1	—	—	—
16	1	—	1	—	—	—
30	2	1	1	—	—	—
51	1	—	1	—	—	—
Total	208	30	84	54	36	4
Average	3.34	3.37	4.04	2.65	2.94	1.50

TABLE 10—Frequency distribution of reported duration of critical effects

(Number of reports showing kills lasting indicated number of days)

DAYS	ALL REPORTS	AGRICULTURAL	INDUSTRIAL	MUNICIPAL	TRANSPORTATION	OTHER
1	28	5	12	7	2	2
1	52	11	18	11	5	7
2	56	17	29	10	—	—
3	36	9	12	5	4	6
4	12	4	5	—	—	3
5	8	3	1	2	1	1
6	—	—	—	—	—	—
7	6	—	4	2	—	—
8	1	1	—	—	—	—
9	—	—	—	—	—	—
10	1	—	1	—	—	—
11	—	—	—	—	—	—
12	1	1	—	—	—	—
13	—	—	—	—	—	—
14	2	1	1	—	—	—
15	1	—	1	—	—	—
16	1	—	1	—	—	—
30	2	1	1	—	—	—
51	1	—	—	—	1	—
Total	208	53	86	37	13	19
Average	3.34	3.62	3.60	2.84	2.67	2.74

TABLE 11 — Fish kill summary by degree of severity

SOURCE OF POLLUTION	ALL REPORTS	TOTAL KILL	HEAVY KILL	MODERATE KILL	LIGHT KILL	NOT STATED
Agricultural operations	90	11	42	15	9	13
Industrial operations	139	16	45	32	22	24
Municipal operations	91	7	24	18	11	31
Transportation operations	22	2	10	6	4	—
Other	33	9	9	4	6	5
Total	375	45	130	75	52	73
	PERCENT OF RESPONSES					
Agricultural operations	100.0	12.2	46.7	16.7	10.0	14.4
Industrial operations	100.0	11.5	32.4	23.0	15.8	17.3
Municipal operations	100.0	7.7	26.4	19.8	12.1	34.0
Transportation operations	100.0	9.1	45.4	27.3	18.2	—
Other	100.0	27.3	27.3	12.1	18.2	15.1
Total	100.0	12.0	34.7	20.0	13.9	19.4

REPORT OF POLLUTION CAUSED FISH KILLS

	RIVER OR LAKE	CITY OR TOWN	DATE	CAUSE (SEE CODE BELOW)	TYPE % GAME	TYPE % NON GAME	COMMERCIAL FISH LOSS(%)	ESTIMATED FISH KILLED	SEVERITY TOTAL (1)	SEVERITY HEAVY (2)	SEVERITY MODERATE (3)	SEVERITY LIGHT (4)	ESTIMATED MILES OR ACRES AFFECTED	DURATION DAY	DURATION HOUR
ALABAMA	POPULAR CREEK	ATHENS	8 9 67	11	19%	81%	70%	71,430	1				85A	-	-
	VALLEY CREEK	BESSEMER	5 8 67	31	95%	5%	30%	65,740			3		1M	2	-
	VALLEY CREEK	BESSEMER	7 14 67	31	10%	90%	90%	40,550		2			4M	1	-
	CHICKASAW CREEK	CHICKASAW	5 14 67	23	26%	74%	14%	1,039				4	4M	2	-
	CATOMA CREEK	MONTGOMERY	5 1 67	31	93%	47%	19%	3,168	1				2M	1	12
	LIMESTONE CREEK	MOORESVILLE	8 14 67	11	18%	82%	-	44,880			3		-	-	-
	PAINT ROCK RIVER	PAINT ROCK	8 9 67	11	-	-	-	-				-	12M	-	-
ARKANSAS	OSAGE CREEK	BERRYVILLE	7 - 67	31	-	-	-	-				-	-	-	-
	W FORK WHITE RIV	FAYETTEVILLE	7 - 67	31	-	-	-	-				-	-	-	-
	DE VUE BAYOR	JONESBORO	7 7 67	50	-	-	-	-				-	-	-	-
	LAKE NIMROD	PLAINVIEW	1 4 67	28	10%	90%	-	13,900		2			198A	-	-
	LAKE NIMROD	PLAINVIEW	4 23 67	28	25%	75%	50%	-			3		3M	2	-
	LAKE WILSON	PORTLAND	8 20 67	11	-	-	-	-				-	-	-	-
CALIFORNIA	COTTON TAIL CREEK	CAYUCOS	2 20 67	26	90%	10%	-	1,000				-	2M	-	-
	MOKELUMNE RIVER	CLEMENTS	1 30 67	21	100%	0%	-	7,100		2			-	-	-
	MORRISON CREEK	CRESCENT CITY	1 1 67	11	55%	45%	-	88	1				1M	1	-
	MILL DITCH	ETNA	4 18 67	50	100%	0%	-	200		2			1M	1	-
	MIDDLE FK-SMITH R	GASQUET	9 5 67	50	100%	0%	-	900	1				2M	3	-
	NAPA CREEK	NAPA	6 15 67	33	50%	50%	-	5,000				-	2M	-	-
	LOPEZ CREEK	S LUS OBISPO CO	8 23 67	34	100%	0%	-	325				-	1M	-	-
	S LUIS OBISPO CR	SAN LUIS OBISPO	8 25 67	31	100%	0%	-	600				-	1M	-	-
	DRY CREEK	WATERFORD	7 1 67	11	-	-	-	300				-	-	-	-
	PAJARO RIV LAGOON	WATSONVILLE	10 12 67	31	0%	100%	-	900	1				3M	-	-
COLORADO	ROARING FORK	ASPEN	8 24 67	31	10%	90%	-	11,000		2			2M	-	-
	LA GARITA FISH PD	CREEDE	4 28 67	21	100%	0%	-	5,000	1				1A	2	-
	BIG THOMPSON RIV	GREELY	5 23 67	31	0%	100%	-	80		2			1M	-	-
	SOUTH PLATTE RIV	KASSLER	4 12 67	26	87%	13%	-	-	1				-	-	-
	BALLOR LAKE	LONGMONT	4 1 67	31	100%	0%	-	-			3		50A	-	-
	BIG THOMPSON RIV	LOVELAND	5 10 67	31	0%	100%	-	-	1				2M	-	-
	BIG THOMPSON RIV	LOVELAND	10 17 67	22	0%	100%	-	-	1				-	-	-
CONNECTICUT	BARBER POND	BLOOMFIELD	4 19 67	26	90%	10%	-	-				-	13A	-	-
	TUMBLE BROOK	BLOOMFIELD	9 5 67	50	5%	95%	-	-		2			2M	-	-
	NORTON RIV-TRIB	NEW CANAAN	2 2 67	44	20%	80%	-	-		2			-	-	-
	WORONPAKOOK LAKE	SALISBURY	7 8 67	50	1%	99%	-	-		2			144A	5	-
	CONN R-SMALL TRIB	WINDSOR/WILSON/	8 24 67	26	0%	100%	-	7,300				-	1M	-	-
DELAWARE	FOLLY POND	NEWPORT	1 24 67	31	-	-	-	200		2			4I	-	-
FLORIDA	LAKE MARIE	DUNDEE	7 8 67	11	97%	3%	-	164		2			33A	8	-
	PEACE RIVER	FT MEADE-ARCADA	3 11 67	21	60%	40%	10%	983,430		2			76M	3	-
	LAKE HENRY	FT MEADE	8 2 67	11	95%	5%	-	61,745		2			90A	5	-
	SADDLE CREEK	LAKELAND	3 11 67	21	50%	50%	-	8,649		2			2M	1	-
GEORGIA	FARM POND	CLAXTON	5 - 67	13	100%	0%	-	-		2			6A	-	-
	FARM POND	METTER	2 16 67	13	100%	0%	-	-		2			3A	-	-
	FARM POND	SCREVEN	4 10 67	13	100%	0%	-	-		2			6A	-	-
	CANOOCHEE RIVER	SWAINSBORO	8 30 67	28	-	-	-	-			3		-	1	-
IDAHO	7 MILE DRAIN	BOISE	4 1 67	28	100%	0%	-	400		2			-	-	-
	BILLINGSLEY CREEK	HAGERMAN	3 28 67	11	100%	0%	94%	32,079		2			16	-	-
	CLEARWATER RIVER	LEWISTON	8 5 67	12	20%	80%	-	5,000			3		1M	-	6
	SNAKE RIV-DRY BED	MERAN	4 4 67	22	6%	94%	100%	500		2			10M	10	-
ILLINOIS	LICK CREEK	DANVILLE	7 24 67	31	4%	96%	-	12,541		2			-	2	-
	LITTLE MENOMINE R	GALENA	4 25 67	24	62%	38%	28%	528	1				1M	-	-
	SALINE RIVER	JUNCTION	7 13 67	21	19%	81%	1%	43,073		2			14M	1	-
	OTTER CREEK	MILLEDGEVILLE	6 9 67	10	0%	100%	28%	13,799	1				-	-	-
	STONY CREEK	MUNCIE	6 25 67	13	26%	74%	10%	10,838		2			4M	1	-
	MUD RUN	PRINCEVILLE	9 8 67	22	10%	90%	13%	3,276		2			3M	5	-
	ROCK RUN	ROCK CITY	6 11 67	22	1%	99%	6%	47,731		2			8M	-	-
	N FK VERMILON RIV	ROSSVILLE	10 24 67	22	11%	89%	8%	3,675		2			3M	-	-
	RUSH CREEK	STOCKTON	8 20 67	44	2%	98%	7%	6,757		2			2M	-	-
INDIANA	MUSCATATUCK RIVER	AUSTIN	6 22 67	22	-	-	-	-				-	-	-	-
	CLEAR CREEK	BLOOMINGTON	7 21 67	31	-	-	-	500		2			-	-	-
	LITTLE DEER CREEK	BUNKER HILL	10 11 67	50	5%	95%	-	400		2			3M	-	-
	LITTLE BLUE RIVER	ENGLISH	7 18 67	50	13%	87%	-	980	1				2M	-	-
	SO FK WILDCAT CR	FRANKFORT	8 29 67	31	20%	80%	-	2,500		2			2M	2	-
	BIG WALNUT CREEK	GREENCASTLE	9 25 67	31	7%	93%	-	2,000		2			6M	-	-
	WHITE RIVER	INDIANAPOLIS	7 28 67	50	30%	70%	-	6,200		2			8M	-	-
	WHITE RIVER	INDIANAPOLIS	8 9 67	31	2%	98%	-	200				-	2M	-	-
	GRASSY CREEK	INDIANAPOLIS	9 1 67	31	14%	86%	-	400	1				2M	-	-
	KOKOMO CREEK	KOKOMO	5 25 67	27	-	-	-	311			3		1M	-	-
	WABASH RIVER	LAFAYETTE	8 17 67	31	-	-	-	-				-	-	-	-
	WABASH RIVER	LAFAYETTE	8 28 67	31	-	-	-	-				-	-	-	-
	LITTLE MONON DTCH	MONON	4 20 67	50	10%	90%	-	-	1				8M	-	-
	BEAVER CREEK	NORCROSS	8 1 67	31	13%	87%	-	900			3		2M	-	-
	CARPENTER CREEK	REMINGTON	7 22 67	24	-	-	-	25				-	-	-	-
	LITTLE BLUE RIVER	SHELBYVILLE	7 18 67	26	5%	95%	-	450			3		-	2	-
	EAGLE CREEK	SHERIDAN	5 16 67	31	43%	57%	-	4,100	1				13M	3	-
	TAYLOR CREEK	SNAYZEE	9 19 67	22	2%	98%	-	450				-	1M	-	-
	TREATY CREEK	WABASH	8 10 67	24	15%	85%	-	3,100		2			-	-	-
	RICHLAND CREEK	WHITEHALL	9 22 67	13	25%	75%	-	400		2			3M	3	-
IOWA	PRAIRIE CREEK	BERNARD	9 10 67	11	5%	95%	-	3,000		2			4M	2	-
	MISSISSIPPI RIVER	BURLINGTON	7 21 67	43	30%	70%	-	50,000		2			1M	-	3
	CEDAR RIVER	CEDAR FALLS	8 12 67	31	90%	90%	-	5,000			3		12M	-	8
	WALNUT CREEK	FAIRFIELD	5 5 67	42	-	-	-	100				-	-	-	-
	ASHTON CREEK	HOLSTEIN	10 18 67	13	2%	98%	-	2,000			3		3M	-	-
	IOWA RIVER	IOWA FALLS	9 18 67	22	2%	98%	-	50,000	1				5M	-	-
	CAMP CREEK	LYTTON	7 26 67	31	5%	95%	-	3,000		2			6M	-	-
	DES MOINES RIVER	OTTUMWA	5 26 67	31	30%	70%	-	5,000				-	1M	-	12
	NORTH RACCOON RIV	SAC CITY	8 10 67	31	10%	90%	-	3,000			3		9M	1	-
	NORTH RACCOON RIV	SAC CITY	9 25 67	31	30%	70%	-	-		2			7M	-	12
	LITTLE SIOUX RIV	SPENCER	5 31 67	31	-	-	-	-				-	-	-	-
	TARKIO RIVER	STANTON	8 6 67	12	40%	60%	-	5,000	1				15M	2	-
	BOONE RIVER	WEBSTER CITY	9 28 67	22	2%	98%	-	6,349,200	1				7M	-	-

KANSAS	BIG WALNUT RIVER	AUGUSTA	3	1	67	25	30%	70%	75%	8.000		2			2M	14	-
	FOUR MILE CREEK	AUGUSTA	4	2	67	13	30%	70%	20%	30.000		2			3M	4	-
	SOLOMON RIVER	BELOIT	7	8	67	13	80%	20%	80%	2.000		2			15M	-	20
	SPRING CREEK	BROOKVILLE	3	31	67	13	15%	85%	5%	90			3		1M	3	-
	COTTONWOOD RIVER	COTTONWOOD FALLS	3	31	67	13	20%	80%	30%	80.000		2			10M	6	-
	SOUTH WALNUT CR	DIGHTON	4	21	67	13	90%	10%	15%	5.000		2			1M	3	-
	LITTLE WALNUT RIV	DOUGLASS	11	12	67	44	20%	80%	50%	6.400			3		1M	3	-
	NO FK SOLOMON RIV	DOWNS	3	1	67	50	90%	10%	95%	1.000			3		7M	3	-
	BIG WALNUT RIVER	EL DORADO	1	10	67	25	20%	80%	40%	20.000		2			3M	7	-
	COTTONWOOD RIVER	EMPORIA	3	31	67	13	30%	70%	50%	90.000		2			12M	9	-
	COTTONWOOD&NEOSHO R	EMPORIA	3	15	67	13	20%	80%	90%	425.000		2			25M	12	-
	SOLOMON RIVER	GLEN ELDER	7	28	67	13	80%	20%	90%	4.000		2			32M	2	-
	SPRING CREEK	HACKNEY	6	13	67	13	70%	30%	30%	5.000	1				2M	2	-
	COUSKIN CREEK	HAYSVILLE	6	15	67	41	40%	60%	30%	10.000		2			2M	-	-
	COAL CREEK	HUMBOLDT	3	23	67	25	0%	100%	10%	300			3		1M	3	-
	COAL CREEK	HUMBOLDT	4	6	67	25	20%	80%	30%	3.000		2			2M	3	-
	SPRING CREEK	LE LOUP	4	6	67	44	75%	25%	75%	5.000	1				1M	3	-
	CIMMARRON RIVER	LIBERAL	4	10	67	25	50%	90%	10%	4.000		2			2M	2	-
	NO FK SPRING CR	MORRILL	4	30	67	11	20%	80%	30%	500			3		1M	2	-
	S FK MINNESCAH R	NATRONA	4	12	67	13	60%	40%	70%	200		2			5M	2	-
	NEOSHO RIVER	NEOSHO RAPIDS	2	2	67	13	10%	90%	20%	225.000		2			10M	4	-
	JESTER CREGARST L	NEWTON	6	14	67	13	40%	60%	30%	90.000		2			10M	2	-
	LAKE CHRISTA	NEWTON	7	13	67	13	80%	20%	50%	3.900			3		5A	2	-
	CORPSTEIN POND	NORTONVILLE	6	10	67	13	100%	0%	100%	300	1				3A	2	-
	MASTERS POND	OVERLAND PARK	7	19	67	50	100%	0%	60%	1.000	1				3A	3	-
	DOYLE CREEK	PEABODY	4	10	67	13	30%	70%	30%	1.000		2			2M	-	-
	DOYLE CREEK	PEABODY	5	13	67	13	10%	90%	25%	25.000		2			6M	1	-
	COTTONWOOD RIVER	STRONG CITY	3	27	67	13	25%	75%	60%	25.000		2			8M	6	-
	W BR WHITEWATER R	WHITEWATER	4	2	67	13	10%	90%	30%	1.000		2			1M	1	-
KENTUCKY	BEECH FORK	BARDSTOWN	9	25	67	22	5%	95%	60%	-		2			2M	2	-
	GREEN RIVER	LIBERY	6	17	67	31	25%	75%	-	-			3		1M	2	-
LOUISIANA	NEW RIVER	GONZALES	5	8	67	24	40%	60%	30%	2.000		2			6M	2	-
	BAYOU DULAC	HESSMER	8	25	67	11	10%	90%	-	-		2			15M	-	10
	BAYOU BRAUD	SAINT GABRIEL	3	30	67	24	30%	70%	60%	10.000		2			5M	2	-
	TWELVE MILE BAYOU	SHREVEPORT	8	18	67	31	20%	80%	35%	3.500		2			7M	2	-
	RED CHUTE	SLIGO	5	-	67	11	20%	80%	30%	750		2			3M	1	-
	BAYOU TIGRE	WHITE CASTLE	8	22	67	11	20%	80%	35%	1.000				-	7M	3	-
MAINE	PRESTILE STREAM	MARS HILL	7	7	67	22	0%	100%	-	85		2			-	-	-
	ANDROSCOGGIN RIV	TURNER	7	6	67	23	0%	100%	-	-		2			-	-	-
MARYLAND	NW BR ANACOSTIA R	SILVER SPRING	7	18	67	26	0%	100%	-	12				4	1M	-	12
MASSACHUSETTS	FORT MEADOW BROOK	HUDSON	8	3	67	11	10%	90%	-	1.000	1				1M	2	-
MICHIGAN	MUSKEGON RIVER	BIG RAPIDS	9	27	67	50	81%	19%	-	329				4	3M	1	-
	HAYS CREEK	COMMERCE	7	11	67	50	0%	100%	-	1.000				4	1M	1	-
	SAINT JOSEPH RIV	HILLSDALE	5	23	67	22	0%	100%	-	500		2			1M	-	12
	LOWER FLAT RIVER	LOWELL	12	19	67	26	38%	62%	-	4.000				4	2M	-	3
	PERE MARQUETTE LK	LUDINGTON	9	18	67	31	20%	80%	-	900				4	3A	-	-
	PIERSON CREEK	MONTAGUE	4	26	67	24	7%	93%	-	6.700		2			2M	-	12
	NO BR TENMILE CR	WHITEFORD CENTR	4	29	67	28	0%	100%	-	200				4	10M	2	-
	BROWER DR-BLACK R	ZEELAND	7	28	67	24	0%	100%	-	-			3		1M	1	-
MINNESOTA	CHUB LAKE	CLOQUET	7	10	67	11	75%	25%	-	5.000			3		-	2	-
	NINE MILE CREEK	EDINA	10	21	67	26	25%	75%	-	50				4	5M	3	-
	BUFFALO CREEK	PLATO	10	11	67	22	0%	100%	-	-				4	-	2	-
	LE SUEUR RIVER	WASECA	10	11	67	22	25%	75%	-	3.000			3		12M	2	-
MISSOURI	CEDAR CREEK	ASHLAND	11	3	67	21	25%	75%	-	61.000		2			40M	7	-
	BEAVER CREEK	AVA	9	18	67	13	20%	80%	-	5.000		2			2M	2	-
	SULLIVAN POND	FLEMING	9	20	67	50	100%	0%	-	50				4	1A	-	-
	DAVIS CREEK	FULTON	2	19	67	21	40%	60%	-	200			3		1M	4	-
	LITTLE BLUE RIVER	GRANDVIEW	2	9	67	31	0%	100%	-	100			3		1M	2	-
	PERCHE CREEK	HARRISBURG	9	16	67	21	10%	90%	-	1.000			3		2M	2	-
	HERMANN POND	HERMANN	6	15	67	50	85%	15%	-	450		2			1A	-	-
	GOODWIN HOLLOW	LEBANON	3	28	67	31	100%	0%	-	50				4	1M	-	-
	BUFFALO CREEK	LOUISIANA	3	3	67	24	2%	98%	-	2.000			3		1M	2	-
	BUFFALO CREEK	LOUISIANA	4	1	67	24	5%	95%	-	1.000			3		1M	2	-
	BUFFALO CREEK	LOUISIANA	4	11	67	24	2%	98%	-	1.300			3		1M	2	-
	BUFFALO CREEK	LOUISIANA	4	19	67	24	7%	93%	-	5.000			3		1M	4	-
	BUFFALO CREEK	LOUISIANA	9	21	67	24	5%	95%	-	1.000			3		1M	-	-
	BUFFALO CREEK	LOUISIANA	10	14	67	24	3%	97%	-	800			3		-	-	-
	DRAINAGE DITCH	MALDEN	9	22	67	31	50%	50%	-	1.000			3		2M	-	-
	102 RIVER	MARYVILLE	7	18	67	31	20%	80%	-	100				4	1M	1	-
	102 RIVER	MARYVILLE	8	9	67	31	-	-	-	1.250			3		3M	2	-
	LAKEVIEW LAKE	OLD MONROE	8	3	67	50	100%	0%	-	300		2			1A	4	-
	FLAT CREEK	SEDALIA	9	26	67	31	10%	90%	-	200			3		2M	3	-
	WHITE OAK CREEK	WELLSVILLE	9	29	67	24	25%	75%	-	200			3		1M	-	-
MONTANA	BELT CREEK	NEIHART	8	31	67	42	10%	90%	-	200		2			2M	1	-
NEBRASKA	LAURIDSEN PONDS	ATKINSON	9	-	67	13	100%	0%	-	7.000		2			4A	3	-
	CLEAR CREEK	COLUMBUS	6	6	67	13	95%	5%	-	-		2			3M	1	-
	GRAVEL PIT	COZAD	4	13	67	13	10%	90%	-	5.000			3		6A	3	-
	ELM CR-KEARNY CNL	ELM CREEK	6	-	67	13	25%	75%	-	8.750			3		15M	2	-
	HORMEL POND	FREMONT	4	12	67	22	50%	50%	-	200				4	4A	-	6
	UNNAMED DRAIN	MINATARE	8	1	67	13	0%	100%	-	-				4	1M	1	-
	OXBOW POND	NORFOLK	7	19	67	25	0%	100%	-	-		2			10A	1	-
	SMELL CREEK	RICHLAND	7	18	67	13	-	-	-	-				4	1M	-	12
	WEEKA DRIFTWD CAN	TRENTON	8	14	67	11	10%	90%	-	100				4	-	-	-
	TRIB BEAVER CREEK	YORK	10	25	67	22	0%	100%	-	-	1				1M	-	12

* RECEIVED TOO LATE TO BE USED IN TABLES

OPERATIONS CODES CAUSED 10 Agricultural Operations, 11 Pesticide Distribution, Pesticides, etc.; 12 Fertilizers, 13 Manure, Soil, Feedlot Drainage, etc.; 20 Industrial Operations, 21 Mining, 22 Food & Kindred Products, 23 Paper & Allied Products, 24 Chemicals, 25 Petroleum, 26 Metals, 27 Combinations, 28 Other; 30 Municipal Operations, 31 Sewerage System, 32 Refuse Disposal, 33 Water System, 34 Swimming Pool, 35 Power, 40 Transportation Operations, 41 Rail, 42 Truck, 43 Barge or Boat, 44 Pipe Line; 50 Other Operations, 99 Unknown (See Notes, page 15)

REPORT OF POLLUTION CAUSED FISH KILLS

	RIVER OR LAKE	CITY OR TOWN	DATE	CAUSE (SEE CODE PAGE 13)	TYPE % GAME	TYPE % NON GAME	COMMERCIAL FISH LOSS(#)	ESTIMATED FISH KILLED	SEVERITY TOTAL (1)	SEVERITY HEAVY (2)	SEVERITY MODERATE (3)	SEVERITY LIGHT (4)	ESTIMATED MILES OR ACRES AFFECTED	DURATION DAY
NEW HAMPSHIRE	COCHECO RIVER	DOVER	6 7 67	29	2%	98%	98%	-			3		2M	3
	LAKE WINNISQUAM	LACONIA	8 24 67	33	90%	10%	-	-				4	1500A	2
	ORWAY LAKE	RAYMOND	5 - 67	11	98%	2%	-	-			3		-	-
	TUCKER POND	SALISBURY	6 27 67	11	-	-	-	-				4	-	-
	CRESCENT LAKE	UNITY	6 6 67	11	98%	2%	-	-				4	-	-
NEW JERSEY	MOHANSAMELA BROOK	DEPTFORD	7 21 67	32	-	-	-	-		2			2M	-
	WALLACES POND	DEPTFORD	7 25 67	11	0%	100%	-	1,200	1				3A	1
	WEST BROOK	HANDOVER	8 15 67	26	0%	100%	-	100			3		1M	-
	RED VALLEY POND	IMLAYSTOWN	8 1 67	11	20%	80%	-	500		2			5A	-
	PROYCE BROOK	MANVILLE	1 25 67	41	25%	75%	-	4,690	1				2M	2
	TOMS RIVER	OCEAN GATE	8 3 67	31	-	-	-	-				-	-	1
	WIERSOMA POND	PENNINGTON	7 21 67	11	25%	75%	-	200		2			2A	2
	POTTERS POND	POTTERSVILLE	6 18 67	11	5%	95%	-	100			3		1A	3
	THIRD RESHANC RIV	RINGOES	7 19 67	13	5%	95%	-	200			3		1M	2
	TOMS RIVER	TOMS RIVER	6 14 67	31	-	-	-	-				-	-	1
	CROOKED BROOK	TROY HILLS	6 28 67	22	0%	100%	-	100		2			1A	2
	MUSCONETCONG RIV	WARREN GLEN	7 22 67	44	-	-	-	500		2			2M	-
	POMPTON RIVER	WAYNE	6 17 67	31	10%	90%	-	100			3		1M	1
	GREENS LAKE	WENONAH	7 18 67	50	20%	80%	-	300	1				3A	3
	WHIPPANY RIVER	WHIPPANY	7 19 67	33	0%	100%	-	100			3		1M	2
NEW YORK	BROCKPORT CREEK	BROCKPORT	6 11 67	31	0%	100%	-	1,000		2			1M	-
	BROCKPT CR-TRIB 3	BROCKPORT	7 9 67	31	0%	100%	-	150				4	-	-
	FLY CR-STERLNG CR	EAST WILLIAMSON	6 10 67	11	10%	90%	-	10,000		2			2M	-
	EAST ROY CREEK	GAINESVILLE	8 15 67	11	10%	90%	-	10,000		2			6M	1
	WILKINS CREEK	LIVONIA	6 22 67	31	0%	100%	-	100	1				2M	-
	WILKINS CREEK	LIVONIA	6 24 67	31	0%	100%	-	1,000				-	-	-
	MILL CREEK	LOWVILLE	9 3 67	31	0%	100%	-	200			3		1M	-
	HUDSON RIVER	MANITOU	8 30 67	43	-	-	-	250			3		-	-
	VALATIE KILL	NASSAU	9 17 67	27	5%	95%	-	2,500		2			2M	2
	CHENANGO RIVER	OXFORD	8 7 67	27	5%	95%	-	5,000			3		3M	-
	KEUKA LAKE OUTLET	PENN YAN	7 6 67	31	0%	100%	-	12,500		2			2A	2
	UNNAMED POND	POUGHKEEPSIE	6 12 67	11	20%	80%	-	100		2			-	-
	RED CREEK	RED CREEK	9 15 67	22	0%	100%	-	-			3		-	-
	ALLENS CREEK	ROCHESTER	10 14 67	50	0%	100%	-	4,500		2			1M	-
	SENECA RIVER	WATERLOO	8 28 67	31	0%	100%	-	3,000		2			-	-
	SALMON CREEK	WILLIAMSON	7 11 67	22	0%	100%	-	175				4	1M	-
OHIO	ASHTABULA RIVER	ASHTABULA CO	9 23 67	13	-	-	-	127				-	-	-
	GREATER MIAMI RIV	BUTLER CO	7 21 67	28	-	-	-	54,848				-	-	-
	GREATER MIAMI RIV	BUTLER CO	8 9 67	28	-	-	-	1,230				-	-	-
	GREATER MIAMI RIV	BUTLER CO	10 16 67	28	-	-	-	384				-	-	-
	TRIB CBANNION CR	CLERMONT CO	5 29 67	13	-	-	-	224				-	-	-
	GREENVILLE CREEK	DARKE CO	10 8 67	31	-	-	-	93,957				-	-	-
	PRAIRIE RUN	DELAWARE CO	6 12 67	22	-	-	-	2,355				-	-	-
	SANDUSKY BAY	ERIE CO	1 17 67	50	-	-	-	78,795				-	-	-
	TRIB CLEAR CREEK	FAIRFIELD CO	6 7 67	13	-	-	-	221				-	-	-
	CLEAR CREEK	FAIRFIELD CO	8 8 67	26	-	-	-	6				-	-	-
	SUGAR CREEK	FAYETTE CO	7 31 67	11	-	-	-	492				-	-	-
	BIG WALNUT CREEK	FRANKLIN CO	1 23 67	26	-	-	-	3,765				-	-	-
	SCIOTO RIVER	FRANKLIN CO	6 13 67	33	-	-	-	200				-	-	-
	SCIOTO RIVER	FRANKLIN CO	8 16 67	33	-	-	-	35				-	-	-
	SCIOTO RIVER	FRANKLIN CO	9 26 67	31	-	-	-	317,390				-	-	-
	BAD CREEK	FULTON CO	8 18 67	11	-	-	-	51,712				-	-	-
	HASSIE CREEK	GREENE CO	9 20 67	31	-	-	-	976				-	-	-
	SHAWNEE CREEK	GREENE CO	10 5 67	28	-	-	-	9,803				-	-	-
	CROOKED CREEK	GUERNSEY CO	6 23 67	50	-	-	-	1,394				-	-	-
	BLANCHARD RIVER	HANCOCK CO	9 18 67	31	-	-	-	4,284				-	-	-
	STONEY BRANCH	HIGHLAND CO	8 1 67	26	-	-	-	821				-	-	-
	LEES CREEK	HIGHLAND CO	10 1 67	31	-	-	-	64				-	-	-
	LITTLE SALT CREEK	JACKSON CO	6 16 67	31	-	-	-	84				-	-	-
	FLAT RUN	KNOX CO	9 20 67	13	-	-	-	11				-	-	-
	LICKING RIVER	LICKING CO	5 28 67	29	-	-	-	-				-	-	-
	RACCOON CREEK	LICKING CO	6 27 67	28	-	-	-	2,719				-	-	-
	N FK LICKING RIV	LICKING CO	7 16 67	26	-	-	-	200				-	-	-
	MUD RUN	MARION CO	10 16 67	13	-	-	-	44				-	-	-
	E BR BLACK RIVER	MEDINA CO	10 18 67	29	-	-	-	-				-	-	-
	SPRING DITCH	MONTGOMERY CO	7 19 67	31	-	-	-	20				-	-	-
	W BR MAHONING RIV	PORTAGE CO	6 8 67	29	-	-	-	114				-	-	-
	SCIOTO RIVER	ROSS CO	7 31 67	31	-	-	-	42				-	-	-
	SCIOTO RIVER	ROSS CO	8 4 67	23	-	-	-	400				-	-	-
	SANDUSKY RIVER	SANDUSKY CO	1 1 67	50	-	-	-	300,384				-	-	-
	RACCOON CREEK	SANDUSKY CO	5 9 67	26	-	-	-	10				-	-	-
	MUSKELLUNGE CREEK	SANDUSKY CO	6 22 67	31	-	-	-	4,817				-	-	-
	HONEY CREEK	SENECA CO	8 22 67	31	-	-	-	3,081				-	-	-
	SANDUSKY RIVER	SENECA CO	9 20 67	31	-	-	-	702				-	-	-
	STONER CREEK	SENECA CO	9 26 67	13	-	-	-	50				-	-	-
	TRIB LIT SANDY CR	STARK CO	8 17 67	50	-	-	-	2,000				-	-	-
	BEACH CREEK	STARK CO	8 21 67	31	-	-	-	300				-	-	-
	BEACH CREEK	STARK CO	9 18 67	31	-	-	-	153				-	-	-
	TINKER CREEK	SUMMIT CO	9 7 67	31	-	-	-	1,203				-	-	-
	DOG CREEK	VAN WERT CO	8 15 67	31	-	-	-	1,087				-	-	-
	LITTLE MUDDY CR	WARREN CO	9 26 67	31	-	-	-	213				-	-	-
	SAINT JOSEPH RIV	WILLIAMS CO	8 26 67	26	-	-	-	46				-	-	-
	SANDUSKY RIVER	WYANDOT CO	6 9 67	31	-	-	-	41				-	-	-
NORTH CAROLINA	SO FORK NEW RIVER	BOONE	6 24 67	26	55%	45%	-	4,000				4	6M	2
	WINKLER CREEK	BOONE	7 30 67	33	25%	75%	-	1,000				4	1M	-
	CATAWBA RIV-N FK	MARION	3 17 67	28	12%	88%	-	13,000		2			7M	2
	FK BROAD RIV-W FK	ROSMAN	3 16 67	26	0%	100%	-	350				4	1M	-
OKLAHOMA	WASHITA RIVER	DAVIS	7 29 67	31	35%	70%	-	3,500		2			2M	-
	FARM POND	SULPHUR	7 1 67	29	100%	0%	-	1,000			3		2A	4
	UNNAMED STREAM	TULSA	9 29 67	50	40%	60%	-	3,000	1				5M	12
OREGON	UMATILLA RIVER	ECHO	7 3 67	11	5%	95%	-	10,000	1				1M	1
	SAGE RAT&TROUT CR	GATEWAY	3 - 67	13	10%	90%	-	-	1				6M	1
	EDSON CREEK	GOLD BEACH	9 29 67	33	40%	60%	-	5,000		2			2A	1
	TIGER CREEK	HEBO	9 27 67	13	-	-	-	-				-	-	-
	UMATILLA RIVER	PENDLETON	11 28 67	28	95%	5%	-	150				4	5M	1
	SILVER CREEK	SILVERTON	9 6 67	31	10%	90%	-	-		2			1M	-

| | | |

REPORT OF FISH KILLS—CAUSE UNKNOWN

	RIVER OR LAKE	CITY OR TOWN	DATE	CAUSE	TYPE % GAME	TYPE % NON GAME	COMMERCIAL FISH LOSS(%)	ESTIMATED FISH KILLED	SEVERITY (1) TOTAL	(2) HEAVY	(3) MODERATE	(4) LIGHT	ESTIMATED MILES OR ACRES AFFECTED	DUR DAY
ARIZONA	ARIZONA CANAL	PHOENIX	10 23 67	90	3%	97%	-	3,000			3		6M	2
CALIFORNIA	LINDO CHANNEL	CHICO	2 9 67	90	20%	80%	-	1,200	1				2M	-
CONNECTICUT	BRISTOL PARK POND	BRISTOL	3 30 67	90	10%	90%	-	100					-	-
	LAKE QUASSAPAUG	MIDDLEBURY	7 13 67	90	0%	100%	-	-				4	-	-
	SLEEPY HOLLOW PD	SPRINGDALE	6 7 67	90	0%	100%	-	-					-	-
ILLINOIS	SOLDIER CREEK	KANKAKEE	5 18 67	90	4%	96%	51%	2,689		2	3		1M	2
	E BR VERMILION RIV	PURDUEVELLE	6 10 67	90	6%	94%	30%	19,995	1				6M	2
INDIANA	WABASH RIVER	ATTICA	9 22 67	90	1%	99%	-	3,400		2			2M	-
	NEW HOUSE DITCH	FORT WAYNE	7 10 67	90	-	-	-	300		2			-	-
	YOUNG CREEK	FRANKLIN	8 23 67	90	33%	67%	-	1,000	1				-	-
	PAW PAW CREEK	ROANN	8 3 67	90	45%	55%	-	2,100		2			5M	-
	CROOKED CR-SLOUGH	WILLIAMS	5 28 67	90	1%	99%	-	12,000		2			1M	-
IOWA	LITTLE SIOUX	ARTHUR	6 6 67	90	7%	93%	-	2,000				4	22M	2
	OTTER CREEK	CHAPIN	8 4 67	90	0%	100%	-	6,000		2			1M	1
	MISSISSIPPI RIVER	DAKVILLE	6 16 67	90	50%	50%	-	500	1				-	-
	NORTH SKUNK RIVER	SIGGURNEY	6 9 67	90	10%	90%		-				4	1M	-
KENTUCKY	RED BIRD RIVER	ROARK	6 16 67	90	-	-	-	-				-	3M	-
LOUISIANA	MISSISSIPPI RIVER	DONALDSONVILLE	9 20 67	90	2%	98%	98%	5,000			3		100M	-
MICHIGAN	GRAND RIVER	GRAND RAPIDS	7 21 67	90	0%	100%	-	30				4	1M	-
	BLACK RIVER	KIBBIE	8 12 67	90	0%	100%	-	50				4	1M	-
MISSOURI	NORTH MOREAU RIV	LOHMAN	5 27 67	90	-	-	-	-				4	-	-
	EAST LOCUST CREEK	MILAN	3 21 67	90	-	-	-	-				4	-	-
	LITTLE BLUE RIVER	RAYTOWN	3 14 67	90	-	-	-	-				4	-	-
NEBRASKA	SOUTH PLATTE RIV	BIG SPRINGS	12 - 67	90	-	-	-	-			3		-	-
	ART AINSLEY POND	HAY SPRINGS	5 14 67	90	100%	0%	-	500	1				-	-
	GEHRING POND	HUMPHREY	7 27 67	90	100%	0%	-	700			3		-	-
	WELCH POND	WILFORD	7 20 67	90	100%	0%	-	68				4	2A	-
	SWAN CREEK	SWANTON	7 15 67	90	10%	90%	-	100				4	2M	-
	RAWHIDE CREEK	VALLEY	7 26 67	90	15%	85%	-	13,000		2			2M	-
NEW YORK	CATTARAUGUS CREEK	ARCADE	6 5 67	90	0%	100%	-	250			3		-	-
	OWASCO INLET	GROTON	6 5 67	90	2%	98%	-	1,300			3		1M	-
	CHADEKOIN RIVER	JAMESTOWN	6 22 67	90	10%	90%	-	10,000		2			1M	-
	CHENANGO RIVER	NORWICH	6 13 67	90	10%	90%	-	5,000				4	2M	-
	UNNAMED TRIB 8	ROCHESTER	9 14 67	90	0%	100%	-	2,000		2			1M	-
	OATKA CREEK	WARSAW	6 28 67	90	10%	90%	-	2,000		2			1M	-
NORTH CAROLINA	CROSS CREEK	FAYETTEVILLE	8 4 67	90	1%	99%	-	675		2			1M	-
	LITTLE RIVER	SPRING LAKE	6 15 67	90	6%	94%	-	1,000				4	3M	-
OHIO	AUGLAIZE RIVER	ALLEN CO	8 22 67	90	-	-	-	512					-	-
	BUCK CREEK	CLARK CO	6 8 67	90	-	-	-	2,008					-	-
	ROCKY RIVER	CUYAHOGA CO	9 18 67	90	-	-	-	6					-	-
	HELLBRANCH RUN	FRANKLIN CO	1 17 67	90	-	-	-	25					-	-
	SCIOTO RIVER	FRANKLIN CO	7 3 67	90	-	-	-	6					-	-
	SCIOTO RIVER	HARDIN CO	5 26 67	90	-	-	-	6					-	-
	N FK LICKING RIV	LICKING CO	9 13 67	90	-	-	-	75					-	-
	CEDAR CREEK	LUCAS CO	10 12 67	90	-	-	-	3					-	-
	ISLAND CREEK	MAHONING CO	10 1 67	90	-	-	-	38					-	-
	HOLES CREEK	MONTGOMERY CO	6 15 67	90	-	-	-	30					-	-
	GREATER MIAMI RIV	MONTGOMERY CO	7 31 67	90	-	-	-	3					-	-
	GREATER MIAMI RIV	MONTGOMERY CO	9 23 67	90	-	-	-	30,213					-	-
	OTTER CREEK	MORROW CO	8 5 67	90	-	-	-	27					-	-
OREGON	GILBERT CREEK	GRANTS PASS	5 29 67	90	98%	2%	-	1,500	1				2M	-
	EIGHTMILE CREEK	THE DALLES	8 - 67	90	-	-	-	-	1				-	-
PENNSYLVANIA	LEHIGH RIVER	ALLENTOWN	6 4 67	90	97%	3%	-	9,800			3		15M	-
	BERTSCH CREEK	BERLINSVILLE	4 1 67	90	100%	0%	-	100				4	1M	-
	PRIVATE POND	CAMBRIDGE SPRNG	4 27 67	90	80%	20%	-	125				4	2A	-
	CONODOGUINET CRK	CAMP HILL	6 12 67	90	75%	25%	-	400				4	3M	-
	WEST VALLEY CREEK	EXTON	5 24 67	90	40%	60%	-	458				4	1M	-
	HILLS CREEK LAKE	MANSFIELD	6 11 67	90	100%	0%	-	1,375			3		40A	-
	MAHONING CREEK	PUNXSUTAWNEY	6 18 67	90	1%	99%	-	2,500			3		3M	-
	CLARION RIVER	RIDGWAY	6 12 67	90	50%	50%	-	6,660		2			6M	-
	HUBBEL RUN	WATTSBURG	6 18 67	90	3%	97%	-	200				4	2M	-
TENNESSEE	CHICKAMAUGA LAKE	CHATTANOOGA	6 6 67	90	0%	100%	-	1,000			3		-	-
TEXAS	NECHES RIVER	BEAUMONT	7 24 67	90	50%	50%	-	100				4	3M	-
	SABINE RIVER	CARTHAGE	10 23 67	90	50%	50%	-	10,000			3		30M	-
	CRYSTAL CREEK	CONROE	4 18 67	90	25%	75%	-	-			3		10M	-
	DICKINSON BAYOU	DICKINSON	7 5 67	90	20%	80%	-	-				4	1M	-
	GULF OF MEXICO	FREEPORT	5 25 67	90	-	-	-	-		2			-	-
	UPP GALVESTON BAY	LA PORTE	7 19 67	90	0%	100%	100%	1,000				4	-	-
	GALVESTON BAY	LA PORTE	7 26 67	90	0%	100%	99%	-		2			3M	-
	LITTLE CYPRESS CR	MARSHALL	8 28 67	90	40%	60%	-	-				4	1M	-
	INTRACOASTL CANAL	PORT ARTHUR	5 21 67	90	85%	15%	-	-		2			23M	-
	TRINITY RIVER	RIVERSIDE	4 29 67	90	5%	95%	-	-		2			-	-
	BLANCO-S MARCOS R	SAN MARCOS	9 16 67	90	20%	80%	-	1,500		2			15M	-
	COLORADO RIVER	SILVER	3 12 67	90	15%	85%	-	2,000		2			1M	-
	TRINITY RIVER	TRINITY	4 27 67	90	10%	90%	-	-				4	-	-
WEST VIRGINIA	BLUESTONE RIVER	BRAMWELL	7 24 67	90	50%	50%	-	1,000		2			-	-
	OHIO RIVER	MOUNDSVILLE	6 12 67	90	10%	90%	-	3,000				4	-	-
WYOMING	SHOSHONE	CODY	4 19 67	90	94%	6%	-	33				4	3M	-